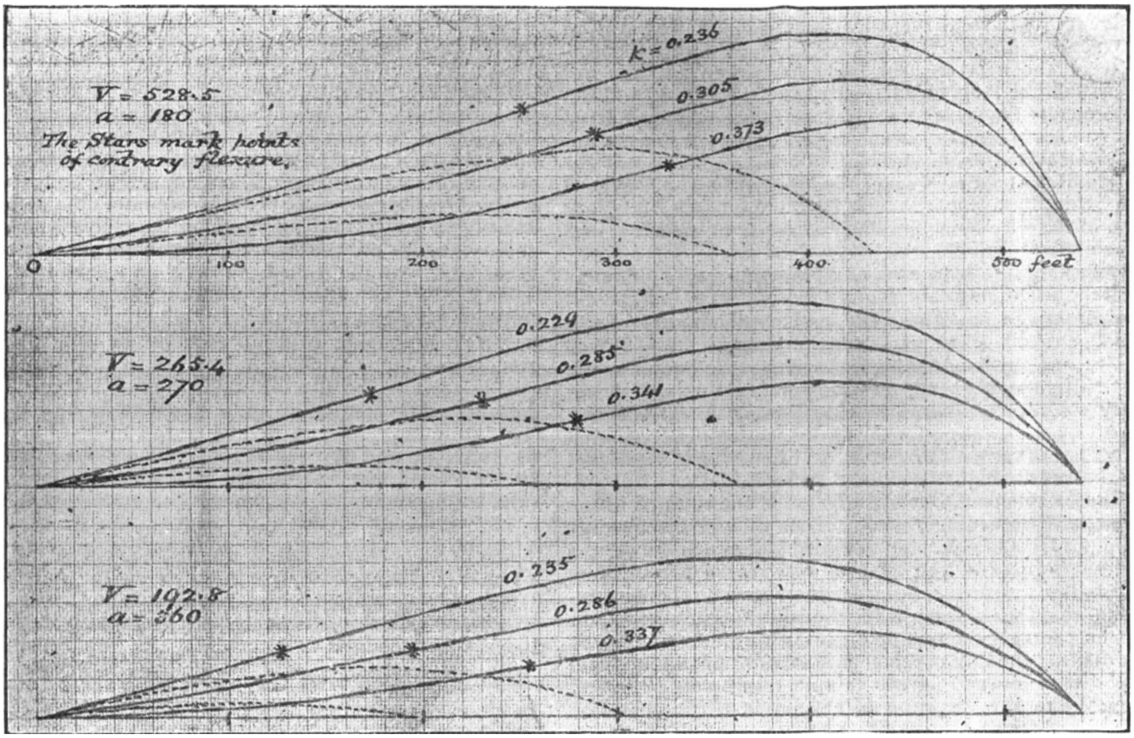
the well ascertained data $6^{s}{\cdot}5$ for the time of flight, and 540 feet for the carry, thus obtaining a general expression for V in terms of a. Then, in consequence of the want of accurate data, I chose three values of a, one considerably less than, the second nearly equal to, and the third considerably greater than, that which results from Bashforth's experiments with iron spheres. Thus I found the following values:—

a	V
180	528
270	265·4
360	193·



Next, with each pair of these numbers, and with the successive values $\frac{1}{4}$, $\frac{1}{8}$, and 0 for e, I found k from the condition that $y = 0$ for $x = 540$. These values of k are of course greater as e is less, and also as a is less. But all are found to lie between the limits derived, above, from the data for a sliced ball. All the constants being thus found, the curves were easily traced by a few points:—and the position of the maximum ordinate was found as above. For contrast, I have put in (dotted) the paths of drives corresponding in all respects with the others, except the absence of rotation. Poorly as these show, they are probably unduly favoured at the expense of the others, as I have taken a the same for each of the group; though it is probably reduced by the spin, so that rotation increases the direct resistance. The comparison of these with those in which rotation has a share shows that, though strength and agility are undoubtedly of importance in long-driving, even a store of these qualities equalling in amount that of a full-sized tiger is comparatively inefficient as against the skill which imparts a sound undercut. For here, as elsewhere, the race is not to the swift, nor the battle to the strong. Craft beats Kraft all the world over! La Puissance! ce n'est pas frapper fort, mais frapper juste!

From the very nature of the process I used in approximating, none of these curves can be quite trustworthy, those giving the greater elevations being most at fault. I regret this for the additional reason that I should have liked to add an illustration of an extremely exaggerated path in which e is (say) zero, and k unity at the least. Under conditions of this kind there might be kinks in the path! For a similar reason I cannot attempt to work out the effect of wind with any attempt at precision, at least in the case when the drive is against the wind and the upward concavity of the path becomes in consequence much more prominent. It is easy in every case to *form* the more exact equations, but the labour of treating them even to a rough approximation would be considerable.

I am engaged at present in endeavours to find something like a proper value of a, or of V, above; so as to have reasonable confidence in my data before I engage in what promises to be a heavy task. Of course, if I can obtain a satisfactory value of one of them, that of the other would follow. But independent determinations of both would enable me to subject the theory to the most complete test imaginable. I am inclined to think that the value of a (280 feet), which I calculated from Bashforth's data, is too large (*i.e.* it makes the resistance too small) for a golf-ball:—and thus that the true path is intermediate in form between those of the first and of the second series in the cut. For the initial speeds required, even with $a = 270$, to give a carry of 540 feet *without spin*, are 462 and 653 foot-seconds for slopes of 1 in 4 and 1 in 8 respectively:—the corresponding times of flight being only $3^{s}{\cdot}7$ and $2^{s}{\cdot}6$.

P. G. TAIT.

NOTES.

WE are glad to record that the Council of the Imperial University of Kasan has elected Prof. J. J. Sylvester honorary member of the University.

THE Albert Medal of the Society of Arts for the present year has been awarded to Sir John Bennet Lawes and a like medal to Mr. John Henry Gilbert "for their joint services to scientific agriculture, and notably for the researches which throughout a period of fifty years have been carried on by them at the experimental farm, Rothamsted."

PROF. W. H. PICKERING, the Director of the Harvard College Mountain Observatory at Arequipa, is expected to be in London in the course of a few days.

THE distribution of prizes to the students of Charing Cross Hospital Medical School will take place at the School on July 4, at three o'clock precisely. The Right Hon. the Baron de Worms, M.P., F.R.S., will occupy the chair.

THE Dental Hospital of London will hold a *conversazione* at the Royal Institute Galleries, Piccadilly, on July 14. There will be a distribution of prizes at 8.30 p.m. by Prof. Sir W. H. Flower, K.C.B., F.R.S.

ACCORDING to Dalziel's agency, a cyclone passed over Williamstown and its immediate vicinity on June 21. Its path was six miles long by half a mile wide, and in this track not a house, barn, or tree was left standing. The wind-rush was followed by a terrific downpour of rain. About twenty persons lost their lives.

DR. NANSEN and the members of his expedition to the North Pole sailed from Christiania on Saturday, and arrived at Laurvig on the following day. After taking on board two covered boats, to be used in case the members of the expedition are compelled to leave the *Fram* in the ice, the vessel proceeded on her voyage. Reuter says that intelligence has been received from Siberia that twenty-six dogs, for service with the expedition, have been brought down to the mouth of the River Olensk. Parties have been sent out to leave stores of provisions for twelve men at two places on the islands of Kotelnoi and Liakow. These depots will be inspected in 1894 and 1895. Sealers report that the sea around these islands was quite open in 1888, 1889, and 1890, while in 1891 and 1892 there was little ice in the vicinity.

INFORMATION with regard to the social, physical, and mental condition of children is being accumulated by the committee appointed by the International Congress of Hygiene and Demography. Nearly 30,000 children, chiefly in London Board Schools, have been inspected, and important facts have been obtained as to the variation of educational requirements of boys and girls, and the causes of low mental development. It is desired to extend the inquiry among 100,000 children before submitting the statistics to a complete investigation. For this purpose Sir Douglas Galton, writing from the Parkes Museum, has made an appeal for financial help. The deep importance of the work is fully understood by educationalists, hence there should be no difficulty in obtaining sufficient funds to render the investigation as comprehensive as possible.

A SPECIAL general meeting of the Royal Geographical Society will be held on July 3 in the hall of the University of London, Burlington Gardens, to consider the proposal that ladies should be admitted as ordinary Fellows. On the evening of the same day the Earl of Dunmore will give a paper on his "Journeys in the Pamirs and Central Asia."

DR. M. MŒBIUS, of Heidelberg, has been appointed Director of the Botanic Gardens at Frankfort-a-M., and Dr. F. Pax, Director of the Botanic Garden at Breslau.

THE French Academy has awarded the Prix Desmazières to M. P. Viala, for his researches on viticulture; the Prix Montagne to M. l'Abbé Hue, for his work in lichenology; and the Prix de la Fons Mélicocq to M. Maseleff, for his work on the Botanical Geography of the north of France.

SOME interesting scientific documents changed hands at the sale this week of the library of the late Lord Brabourne. Among the lots was a quantity of the correspondence of Sir Joseph Banks, to whom Sir Edward Knatchbull, Lord Brabourne's father, was executor. An interesting autograph letter from John Hunter, dated 1792, appears to be one covering the despatch to the Royal Society of his paper on the natural history of the common bee. He hopes Sir Joseph and his worthy council will think the results of twenty years of observation and experiment suitable for publication in the transactions, and details some of the obstacles which had prevented an earlier forwarding of the paper. About 1830 the Royal Society claimed and received from Sir Edward Knatchbull the letters and papers of Sir Joseph Banks, referring to the society over which he so long presided, but evidently this particular letter was overlooked. A document, apparently in the handwriting of Duhamel du Monceau, is an appeal to Sir Joseph on behalf of Dolomieu, the French mineralogist, imprisoned at Messina, by order of the Neapolitan Court, as he was returning to Europe from serving on the scientific staff which accompanied Bonaparte's expedition to Egypt. It is signed by thirty-nine famous men of science of the time, including Cuvier, Lamarck, Laplace and Lalande.

THE weather during the past week has been of a decidedly unsettled type. On Thursday, the 22nd inst., a depression advanced over Scotland and moved slowly to the North Sea and Norway, causing some rain over most parts of these islands; in the north-east of Scotland the fall amounted to 2·2 inches in forty-eight hours, and a moderate gale blew from the north-west on our northern coasts. During the early part of the present week important depressions advanced over the western parts of the country from off the Atlantic, causing exceptionally heavy rain in the south of Ireland, the fall at Roche's Point on Tuesday morning registering 1·1 inch, while the amount was very considerable in many other parts of the kingdom. During the first part of the period the temperature was from 25° to 30° lower than in the previous week; the maxima rarely reached 70° in any part of the country, while in the north the highest daily readings were frequently below 60°, but on Tuesday the temperature rose considerably in most parts, and reached 80° at Cambridge. The *Weekly Weather Report* of the 24th inst. showed that the rainfall exceeded the mean in the east of Scotland only. Bright sunshine was above the average in Ireland and the greater part of England; the percentage of possible duration amounted to 77 in the Channel Islands.

MR. W. H. PREECE, F.R.S., in giving evidence before the joint committee of Lords and Commons on Electric Powers Protective Clauses, is reported to have shown a series of diagrams illustrating the effect upon the earth of the City and South London Electric Railway. That railway did not designedly use the earth, but the return circuit was made by means of the rails, and also by the tubes or tunnels. Currents were produced which had disturbed the observing instruments at Greenwich, and which had been traced as far as North Walsham, in Norfolk. Last year the disturbances began to increase, and his attention was called to the fact that in Clapham Road there was a chemist who had in his shop window an instrument for recording the passing movement of every train on the electric railway, the instrument being connected on one side with gas-pipes, and on the other with water-pipes in the house. He had caused the currents to be measured, and they were found to be sufficient to light a lamp or, as he had proved, to ring one of the division bells of the House of Commons. Another difficulty had occurred in connection with the railway block system. Some years ago the London and North-Western Railway lighted Holyhead Harbour by electricity. The effect of the five arc-lamps employed was to break down the block signals in the district within a mile. But the difficulty was removed by supplying metallic circuits to the signals. At Blackpool the disturbing currents from the electric tramway had lowered a block-signal on the railway and fired a time gun at the same moment, a minute or so before the time when the gun ought to have been discharged.

IN the recently published number of the Proceedings of the Société Française de Physique there is an account of a standard condenser formed by two plates of silvered glass separated by three blocks of quartz accurately worked to the same thickness. The instrument almost exactly realises a theoretical condenser, as the central part is only separated from the guard-ring by a narrow line along which the silver has been removed. The only disadvantage is that the insulation is rather bad, and when the air is not perfectly dry there is a small current between the central disc and the guard-ring. To get over this difficulty the author (M. P. Curie) joins the electrometer to the continuous plate of the condenser, charges the central disc of the other plate with the battery, and connects the guard-ring with the earth. Under these conditions the field of force between the plates is no longer uniform, but the charge of the condenser is the same as in the ordinary arrangement. With this arrangement the insulation is all that can be desired, as the quartz blocks are very good insulators, and little affected by moisture in the air.

A SIMILAR condenser to that described above has been employed by M. Abraham in his determination of the ratio between the electromagnetic and electrostatic units (see Proceedings of Société de Physique, p. 332, 1893). The method employed for measuring the distance between the plates is as follows. In front of the space between the plates a finely-divided glass scale is placed with its plane perpendicular, and the lines of the graduations parallel to the plates. The silvered plates constitute excellent mirrors, and give a series of images of the divisions of the scale, the distances between which were measured by means of a microscope. This method gives the mean distance between the plates, which was found to vary each time the instrument was set up, and to differ slightly from the length of the quartz blocks employed to separate the plates.

THE photographic study of sources of light by means of a carefully graduated series of exposures was first applied with great success by M. Janssen to the investigation of the minute structure of the solar surface. M. Crova has applied a similar method to the study of the carcel standard and the electric arc. A contrast between the various parts of the magnified photographic image of the carcel flame does not appear until the exposure is reduced to the minimum necessary to secure an impression, and to bring out this contrast the negative must be developed slowly and subsequently intensified. Four photographs thus obtained were exhibited at a recent meeting of the French Academy. The axis of the flame appears dark, and the zone of combustion exhibits two bright lines representing the external and internal surfaces of combustion of the hydrocarbons, with a dark line between them corresponding to the space where combustion is incomplete. Photographs of the flames of a candle, an amyl-acetate burner, and a bat's-wing gas jet were also exhibited, showing analogous phenomena. The same method applied to the arc light yielded some interesting results. As the time of exposure was reduced the arc gradually vanished, the negative carbon was reduced to a very small surface, and the positive carbon exhibited a surface riddled with dark spots, and granulated like the surface of the sun in M. Janssen's photographs. These granulations could be seen in violent motion on the ground glass screen of a camera with the lens sufficiently stopped down. It follows that it is not admissible to screen off all but a very small portion of the luminous source in order to reduce the amount of light in the same proportion as the area of luminous surface. With very small surface elements both the amount of light and the temperature, and hence also the tint of the light, may be constantly changing.

HERR VON LUPIN, of Munich, has recently called attention to two thermometer liquids as free from certain drawbacks of the spirit thermometer. One of these is sulphuric acid diluted with water. According to experiments by Sohncke, the quantity of water removed by distillation in the thermometer-tube was a minimum even when the free end was surrounded with ice; and (what is still more important) in a short time this very small quantity was reabsorbed. The expansion of the liquid is approximately constant. In a recent expedition by Herr Vogel to Central Brazil these minimum thermometers were used, and found to act very well. The other liquid referred to is chloride of calcium in spirit (10 to 15 per cent. of the anhydrous salt is best). This is specially recommended for medical use, because its pronounced colour enables it to be more easily read at night than the mercury thermometer. Here, too, there is no distillation-error. A further advantage is that the thermometer takes the body-temperature very quickly (in about three minutes). The regularity of expansion between 0° and 50° C. is good, though not in the same degree as with sulphuric acid; and the proportion of calcium chloride is here influential. The solution, like that of sulphuric acid, does not solidify even in the artificial cold of evaporating carbonic acid snow; and with the proportion of salt given, no salt is separated out in the bulb.

To the current number of the *Zeitschrift für physikalische Chemie* Herr Altschul communicates from Prof. Ostwald's laboratory a series of observations on the critical constants of some fatty and aromatic hydrocarbons. Unlike most observers in this field the author thus deals with chemically related substances which have a comparatively simple structure. With the ascent of a homologous series it appears that the critical temperatures increase and the critical pressures decrease at rates which gradually diminish. Chemical constitution also affects the magnitudes of the critical values, the three metameric xylenes, for example, have different constants. From his observations the author deduces the values of (*a*) and (*b*) in Van de Waals's equation, Guye's critical coefficient, &c., and traces relationships between their magnitudes.

Is colour-blindness a product of civilisation? An investigation described in *Science* by Messrs. Blake and Franklin, Physical Laboratory, Kansas University, favours an affirmative answer to the question. Of 159,732 persons tested in Europe and America, nearly four per cent. were found to be colour-blind. But when the ordinary Berlin worsteds were used to test the colour perception of a number of Indians, representing many tribes, only 3 in 418, or 0·7 per cent., were found to be deficient. These were full-blooded Indians, and all males. It appears, therefore, that, as with civilised peoples, the percentage of colour-blind males is greater than that of females.

THE peculiar phenomenon sometimes observed near the Wetter Lake in Sweden, and called by the natives *Motalaströms stadnande*, the standing still of the Motala river, has been the subject of speculation ever since the times when it used to be regarded as a miracle and a portent. The Motala river emerges from the Wetter Lake, and the phenomenon in question consists in the cessation of the flow and the drying up of the bed, accompanied by a retention of water within the lake.

According to Block, this is due to a sudden sharp frost, which freezes the river to the bottom at a shallow place without allowing time for the formation of mere surface ice. It is probable that a strong east wind is a necessary condition, and that the detention of the water is aided by the reeds growing near the outflow of the lake. A collection of records of the occurrence has been made by Herr Robert Sieger in a paper on the oscillations of lake and ocean levels in Scandinavia, which appears in the *Zeitschrift der Gesellschaft für Erdkunde*. He finds six observations during the sixteenth, twelve during the seventeenth, and eighteen in the eighteenth century. He does not, however, think that the general level of the lake is perceptibly influenced by the phenomenon.

TWO organisms resembling the cholera bacillus have recently been obtained by Bujwid from water during an outbreak of cholera ("Ueber zwei neue Arten von Spirillen im Wasser," *Centralblatt für Bakteriologie*, vol. xiii. 1893, p. 120). These are designated as *Bacillus choleroides* α and β in consequence of their striking resemblance to Koch's cholera organism. It is quite possible, however, that these forms may really be identical with the original cholera spirillum, and that the differences noted in cultures and microscopic specimens may be simply due to the modifications undergone by the latter after long residence in artificial culture media. Finkelnburg ("Zur Frage der Variabilität der Cholera bacillen," *ibid*. p. 113) has made careful comparative studies of cholera bacilli obtained from different centres during the recent cholera epidemic. He found that whereas those obtained from Paris and Hamburg respectively were practically identical, they presented slight but distinct deviations from the laboratory specimen of Koch's spirillum originally brought from India. Finkelnburg points out as the result of his investigations that in the course of the many years during which this organism has been cultivated outside the human body and in foreign surroundings, it has apparently undergone a gradual attenuation, and that in this process of degeneration it has lost some of its vital energy. Whether it has also suffered a diminution in its toxic properties Finkelnburg has not yet determined, but concludes by emphasising the importance of such an inquiry as calculated to throw some light on the possible future attenuation of the virus during its residence in Europe.

MR. F. C. SELOUS, who has spent twenty years in South Central Africa, has now completed the book in which he describes his experiences in the country. Messrs. Rowland Ward and Co. will publish the work in the autumn.

A BOOK by Capt. Hayes on "The Points of the Horse," and dealing chiefly with equine conformation, will be published next month by Messrs. Thacker and Co.

THE trustees of the South African Museum have issued their report for the year 1892. Mr. Roland Trimen, F.R.S., the curator of the museum, reports favourably of the condition of the collection generally. The donations amount to 4857 specimens, presented by 90 donors, as against 4677 specimens presented by 105 donors in the year 1891. For a long time extended accommodation has been needed, and we are glad to note that the Parliament granted the application for a sum of £20,000 to satisfy the want. Designs for the new museum building have been invited, and the work will be proceeded with as soon as possible.

THE proceedings of the Bath Natural History and Antiquarian Field Club, No. 4, contains an article by the Rev. H. H. Winwood, on some deep-well borings made in Somerset and one or two other counties. A description is given of the thickness and nature of the beds pierced in each case.

THE second part of "Phycological Memoirs," being researches made in the botanical department of the British Museum, contains, among other papers, several notes on the morphology of the Fucaceæ. Mr. George Murray contributes a comparison of the marine floras of the warm Atlantic, Indian Ocean, and the Cape of Good Hope.

A SERIES of monographs dealing with the principal gold fields of Victoria are being prepared under the direction of Mr. A. W. Howitt, the Secretary for Mines. A report by Mr. E. J. Dunn, on the Bendigo gold-fields, forms one of the number. According to Mr. Dunn, the primary features of this gold-field are that the mass of silurian strata which he investigated is made up of bands auriferous to varying degrees or barren of gold, and that the whole of the strata are bent along certain lines into anticlinal folds with intervening synclinals. The report is illustrated by numerous plans, sections, and diagrams.

THE Scientific Society of the University College of Wales has issued its first report. Natural history specimens collected during the excursions have been identified, and the results recorded in the report furnish some useful information with regard to Welsh fauna and flora.

AT the meeting of the Russian Chemical Society on March 16 K. D. Khroushchoff, who is well known for his remarkable synthesis of hornblende and other minerals, made a communication to the effect that he also has obtained artificial diamonds in a way similar to that of Moissan. He prepared a carbonide of silver, Ag_2C, obtained by the heating of cuminate of silver. At the temperature of boiling, silver absorbs about six per cent. of carbon, which is given out on cooling. Cooling was effected rapidly, as by Moissan, so that a crust was formed which prevented the increase of volume of the metal, and produced a considerable interior pressure. It appeared that part of the dissociated carbon had the properties of diamond—the dust consisting of minute broken crystals and laminæ, colourless and transparent, strongly refracting light, quite isotropic, and scratching corundum; on combustion they give carbon dioxide, with an insignificant amount of ash. Diamond dust obtained in this way was shown to Prof. Beketoff the day after Moissan's communication had been received at St. Petersburg.

FURTHER interesting experiments with the electric furnace are described by M. Moissan in the current number of the *Comptes Rendus*. By attaching to the furnace a condensing tube of copper shaped like the letter U, and so constructed as to be surrounded by an outer jacket of cold water constantly changing under high pressure, M. Moissan has been enabled to distil and condense most of the elements which have hitherto been found so refractory. When a piece of metallic copper weighing over a hundred grams was placed in the inner crucible of the furnace and subjected to the arc furnished by a current of 350 ampères, brilliant flames shot forth from the apertures through which the carbon terminals were inserted. The flames were accompanied by copious yellow fumes, due to the combustion of the issuing vapour of copper in contact with the oxygen of the air. After the expiration of five minutes nearly thirty grams of copper had been volatilised. Under the cover of the furnace an annular deposit of globules of metallic copper was found, and upon examination of the condensing tube a large proportion of the volatilised copper was discovered condensed in almost a pure state. It has long been known that silver is volatile; it is now found that at the temperature of an arc of the above description silver may be brought to full ebullition in a few moments, and it distils with ease, condensing in the copper condenser in the form of small globules, whose size varies from that of small shot to spherules of microscopic dimensions, and a certain proportion is usually deposited in the form of arborescent fragments. Platinum fuses in a few minutes, and very soon after commences to volatilise, and condenses in the U-tube in brilliant little spheres and fine dust. Aluminium distils very readily, and condenses in the form of a grey powder, containing admixed spherules exhibiting brilliant metallic lustre. Tin likewise distils with facility, and the condensed product usually contains a considerable proportion of a curious fibrous variety of the metal. The distillation of gold in the electric furnace is particularly interesting. Abundant fumes of a light yellowish green colour are emitted at the electrode apertures, and the metal is deposited in the condenser in the form of a powder, exhibiting a beautiful purple sheen. The powder consists of minute regular spheres which, when examined under the microscope, appear to reflect the usual yellow colour of gold. Upon the under side of the cover of the furnace three distinct annular deposits are observed, the inner one consisting of yellow globules of considerable size, round which is a metallic deposit of smaller spheres of such a size as to reflect a bright red tint, and outside this is an annular sublimate of a deep purple colour. Manganese is remarkably volatile; a quantity of the metal weighing four hundred grams entirely volatilised in ten minutes. Iron is likewise readily distilled, and is deposited in the form of a grey powder, among which are interspersed numerous small particles exhibiting brilliant surfaces.

NOT only are the metals capable of distillation at the temperature of the electric arc. Silicon rapidly volatilises and condenses in the copper condensing tube in minute spheres and dust. Carbon becomes almost immediately converted to graphite, which distils over into the condenser and deposits in the form of light semi-transparent plates, which by transmitted light exhibit a beautiful chestnut colour. Distilled carbon would thus appear to consist of the fourth variety of the element recently described by M. Berthelot. The refractory alkaline earths appear also to be capable of distillation in the electric furnace. The experiment succeeds best, however, with a more powerful arc. Employing an arc furnished by a current of a thousand ampères, M. Moissan has distilled one hundred grams of lime in five minutes, the vapour condensing in the copper tube like fine flour. Magnesia passes over somewhat more slowly than lime, but its distillation is one of the prettiest of these remarkable experiments, the tints assumed by the escaping fumes and the brilliance of the incandescent vapour being particularly striking.

NOTES from the Marine Biological Station, Plymouth.—The following list completes the summary begun last week of the records given during the last six months of the breeding seasons of marine animals at Plymouth. Among Mollusca, the Prosobranchs *Littorina littoralis*, *Nassa reticulata*, *Buccinum* (*undatum*), *Purpura* (*lapillus*), *Murex erinaceus* and *Capulus hungaricus*, the Opisthobranchs *Lamellaria perspicua*, *Aplysia punctata*, *Philine aperta*, many Nudibranchs, and the Cephalopod *Loligo media*; among Crustacea, the Cladocera *Podon* and *Evadne*, various Cirripedia, the Leptostracan *Nebalia bipes*, several Amphipoda, the Schizopoda *Siriella jaltensis*, *Leptomysis mediterranea*, *Macromysis flexuosa* and *inermis*, *Schistomysis arenosa*, the Cumacean *Pseudocuma cercaria*, the Macrura *Crangon* (*vulgaris*), *fasciatus* and *sculptus*, *Palæmon* (*serratus*), *Palæmonetes varians*, *Pandalus annulicornis* and *brevirostris*, *Hippolyte Cranchii*, *Virbius varians*, *Pagurus lævis* and *Bernhardus*, *Galathea squamifera*, the Brachyura *Porcellana longicornis* and *platycheles*, *Carcinus* (*mænas*), *Portunus depurator*, *holsatus*, *arcuatus*, *marmoreus* and *pusillus*, *Cancer* (*pagurus*), *Pilumnus hirtellus*, *Xantho floridus* and *rivulosus*, *Eurynome* (*aspera*), *Stenorhynchus phalangium* and *tenuirostris*; among Echinodermata, *Echinus miliaris*, *Asterina gibbosa*, and *Amphiura elegans*; among Tunicata, *Botryllus violaceus* and *Styclopsis grossularia*; and among Cephalochordata, *Amphioxus lanceolatus*, have been recorded. It should also be mentioned that the following larvæ have been townetted in large numbers at certain periods:—Veligers, *Cyphonantes*, *Nauplii* and *Zoœæ*, and the various larvæ of Echinoderms.

THE additions to the Zoological Society's Gardens during the past week include two Mozambique Monkeys (*Cercopithecus pygerythrus*, ♂ ♂) from East Africa, presented respectively by Mr. J. B. Tomkins and Mr. B. J. Travers; two Llamas (*Lama peruana*, ♂ ♀) from Peru, presented by Lady Meux, F.Z.S.; a Rose-crested Cockatoo (*Cacatua moluccensis*) from Moluccas, presented by Mrs. Bason; a Greater Sulphur-crested Cockatoo (*Cacatua galerita*) from Australia, presented by Mr. Lewis Baily; a Cinereous Waxbill (*Estrelda cærulescens*), two Hooded Finches (*Spermestes cucullata*), a Grenadier Weaver Bird (*Euplectes oryx*) from West Africa, an Amaduvade Finch (*Estrelda amandava*), two Nutmeg Finches (*Munia punctularia*), a Black-headed Finch (*Munia malacca*) from India, presented by Mr. W. L. Jeffrey; two Greater Spotted Woodpeckers (*Dendrocapus major*) British, presented by Miss Miriam A. Birch Reynardson; two Alexandrine Parrakeets (*Palæornis alexandri*) from India, presented by Mr. Wyndham Gibbs; two Brazilian Tortoises (*Testudo tabulata*) from Trinidad, W.I., presented by Mr. J. S. Toppin; an Ocellated Skink (*Seps ocellatus*) from Malta, presented by Col. C. H. Rooke; two Infernal Snakes (*Boodon infernalis* jv.) from South Africa, presented by the Rev. G. H. R. Fisk, C.M.Z.S.; two Emus (*Dromæus novæ-hollandiæ*) from Australia, deposited; two Collared Fruit Bats (*Cynonycteris collaris*), a Burrhel Wild Sheep (*Ovis burrhel*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET FINLAY (1886 VII.).—The ephemeris for this comet for this week is as follows:—

12h. *Paris. M.T.*

1893.	R.A. (app.) h. m. s.	Decl. (app.) ° ′
June 29	2 52 20	+14 8·7
30	2 57 5	14 31·9
July 1	3 1 49	14 54·6
2	6 33	15 16·9
3	11 16	15 38·6
4	16 0	15 59·9
5	20 42	16 20·6
6	3 25 24	+16 40·9

STARS HAVING PECULIAR SPECTRA.—On an examination of the stellar spectra photographs taken at Cambridge (U.S.A.) and Arequipa it has been found (*Astronomy and Astrophysics* for June) that several of them have spectra which qualify their designation as "interesting objects."

The following list we take from the note referred to:—

Designation	R.A. 1890. h. m.	Decl. 1890. ° ′	Mag.	Description.
B.D. +49°·41	0 12·2	+49 44	9·4	Type IV.
B.D. −13·893	4 24·5	−13 17	5·8	F line bright.
A.G.C 5429	4 43·8	−36 23	7½	Type IV.
A.G.C. 11890	8 42·4	−29 21	7½	Type IV.
—	15 27·0	−71 32	—	Type III. (H lines bright).
A.G.C. 22838	16 47·9	−44 50	8·2	Type V. (bright lines).
Z.C. XVIII.^{h} 56	18 3·3	−63 38	9½	Type III. (H lines bright).
A.G.C. 26129	18 59·7	−38 17	8½	Type IV.
B.D. −21°·6376	23 6·3	−21 32	9·0	Type IV.

All these stars, it will be noticed, with the exception of the first two, have a large southerly declination.

Photographic charts of the region about Z.C. XVIII.^{h} 56 have confirmed the variability of this star. Among other results, photographs of U Virginis, V Boötis, S Geminorum, T Cassiopeiæ, R Piscis Australis et Geminorum, show that these stars give bright hydrogen lines.

THE SUN'S MOTION THROUGH SPACE.—The methods that have generally been adopted for determining the direction of the sun's motion have been based on the same general principle